WHAT IS CLAIMED IS:

1. A method for measuring thicknesses of respective layers of a multilayer thin film, comprising:

irradiating a white light on a sample composed of the multilayer thin film;

spectrally dispersing a reflected light or transmitted light obtained from the sample, and transforming the resultant spectrum into a frequency signal based on wave number units; and

subjecting the frequency signal to wavelet processing for removing components other than coherence signals from the frequency signal, and then to frequency analysis for detecting the thicknesses of the respective layers of the thin film.

2. A method according to claim 1, wherein the frequency analysis is a processing conducted by a fast Fourier transform processing.

3. A method according to claim 1, wherein the frequency analysis is a processing conducted by a maximum entropy method.

4. A method according to claim 1, wherein the white light is irradiated to the sample such that a spot diameter thereof is 0.5 to 1.5 mm.

5. A method according to claim 4, wherein the white light is irradiated to the sample using a stroboscope as a light source such that the sample is exposed to the light for 5 to 15 μsec.

6. A method according to claim 4, wherein the spectrum obtained by the spectral dispersion is transformed into the frequency signal using a CCD sensor having plural rows of pixel arrays, the frequency signal being obtained by integrating peaks of the spectrum by the number of the plural rows of pixel arrays.

7. A method according to claim 5, wherein the spectrum obtained by the spectral dispersion is transformed into the frequency signal using a CCD sensor having plural rows of pixel arrays, the frequency signal being obtained by integrating peaks of the spectrum by the number of the plural rows of pixel arrays.

8. An apparatus for measuring thicknesses of respective layers of a multilayer thin film, comprising a light source emitting a white light; an irradiating optical fiber for irradiating the light emitted from the light source onto a sample; a light-receiving optical fiber for collecting a reflected light or transmitted light obtained from the sample; a monochromator for spectrally dispersing the light transmitted from the light-receiving optical fiber; a multi-channel detector for transforming a spectrum obtained by

spectrally dispersing the light, into an electric signal; and an arithmetic processing means for transforming the electric signal output from the multi-channel detector into a frequency signal based on wave number units and subjecting the frequency signal to an arithmetic processing, said arithmetic processing means having a function for subjecting the frequency signal to wavelet processing for removing components other than coherence signals from the frequency signal, and then to frequency analysis for detecting the thicknesses of respective layers of the thin film.

9. An apparatus according to claim 8, wherein the white light is irradiated to the sample such that a spot diameter thereof is 0.5 to 1.5 mm.

10. An apparatus according to claim 8, wherein the white light is irradiated to the sample using a stroboscope as a light source such that the sample is exposed to the light for 5 to 15 μsec.

11. An apparatus according to claim 9, wherein the multi-channel detector comprises a CCD sensor for transforming the spectrum into the electric signal, the CCD sensor having plural rows of pixel arrays and transforming the spectrum into such a signal obtained by integrating respective peaks of the spectrum by the number of the plural rows of pixel arrays.

12. An apparatus according to claim 10, wherein the multi-channel detector comprises a CCD sensor for transforming the spectrum into the electric signal, the CCD sensor having plural rows of pixel arrays and transforming the spectrum into such a signal obtained by integrating respective peaks of the spectrum by the number of the plural rows of pixel arrays.